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# Method for registration of vaccines for covid 19, through nfc technology

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**Abstract**. In these times of pandemic caused by Covid-19, new ways of dealing with the effects of the virus emerge, for this reason multiple measures are being carried out with the intention of mitigating its effects in the event of a possible contagion, which is why vaccinations are being carried out massive in order to be able to defend oneself against potential contagions, in this work an application made using the NFC communication protocol that mobile devices have is shown, as a result the demonstration of the use of the application is presented, where it reflects the data to be entered and can be viewed from any device.

## 1. Introduction

Carrying out a search for similar works, we found works such as the use of Near Field Communication (NFC) technology, for wireless communication, using protocols for communication between Android devices and NFC readers [1]. We found works where information from social networks based on NFC is analyzed, which will allow people to make friends through the NFC-enabled device, through 3 modes of communication: reading, writing and viewing, through a user interface with the that can be interacted with naturally [2].

This research analyzes the authentication protocol for short-distance wireless communication with the use of NFC technologies, taking into account security vulnerabilities, through a proposal based on pseudonyms to preserve privacy, with which it can be validated. Impersonation, so a secure and efficient authentication protocol used through NFC [3].

We found applications where the NFC protocol available in smartphones is used for payment control, access control and transport, through a Host Card Emulation interface [4]. In this research we analyze about NFC considered with a type of technology through RFID communication in mobile devices, we can indicate that there are security problems since they can perform retransmissions [5]. We found works where NFC technology is presented to replace traditional plastic cards for contactless communication; however, the lack of security against various types of attacks must be taken into account [6]. There are applications with NFC technology where

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transactions are tested using the Europay, Mastercard and Visa protocol, which present vulnerabilities that put transactions at risk [7]. Through the use of NFC technologies, which allow short-distance communication with high performance and low energy consumption implemented in payment applications, access control, transport or file transfer [8]. In the improvement of privacy, for which an anonymous identification method is proposed where the user selectively uses a public key with which privacy is protected by verifying the identification [9]. We found works on the use of the Hippocratic Protocol through NFC technologies, through ANDROID software used by patients and doctors, the data was stored in a server and an open source database, where the patient has the power to decide the type of information they want to share with doctors, with an IMEI authentication [10].

In this research we implemented an application to record vaccine data to prevent the spread of Covid-19, and to be able to share it through the NFC protocol, so that it can be used on any device.

## 2. Materials and Methods

The materials and methods that are presented are related to the demonstration of the interaction between the NFC protocol and mobile devices, as well as an application where it demonstrates its use.

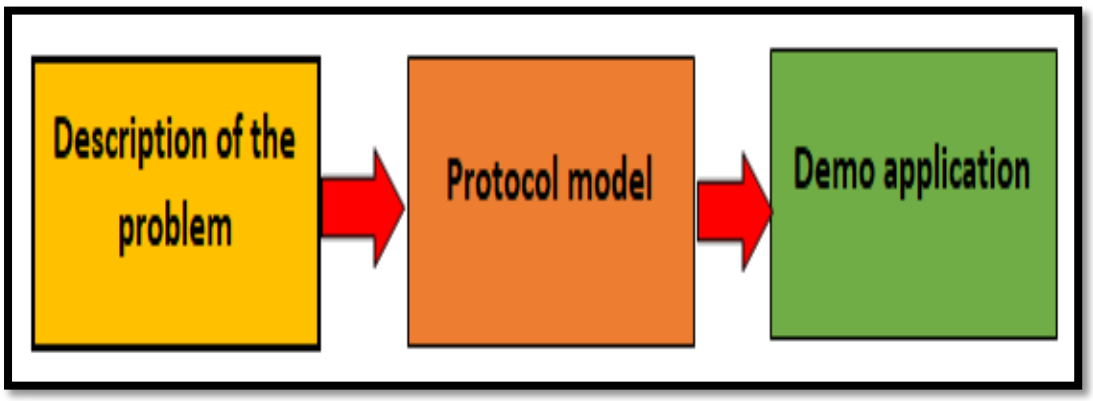



**Figure 1:** Block diagram of the proposal

### *2.1. Description of the problem*

Normally the registration of vaccines is done manually, recorded on a vaccination card, these are subject to deterioration, loss or other accidents that may occur, many of the establishments can request the vaccination card so it may be exposed to deteriorate, now the data is also stored in the databases of the health entities where the vaccinated are registered, it is thus that many of them can access the information systems that have been implemented and be able to download the registry of the vaccines in "pdf" format, in the same way it can only be viewed through the connection by the information systems. Many times these data from the vaccination registry are necessary to be able to share the information to make a decision, and these cannot be shared, therefore our proposal consists of having the information from the vaccination registry available on the mobile device to be able to be viewed and shared when needed.

### *2.2. Protocol model*

The protocol model that is proposed in this work consists mainly of using the NFC protocol that mobile devices have, this protocol allows information to be shared between the various devices that have the protocol and can share information, for our particular case, the information To be able to be shared are the data that correspond to the vaccine data, such as date, brand, batch, so traceability can be made for any situation that is necessary. In figure 2 the diagram of connections between the

various mobile devices is presented, in order to share information, one of the characteristics of the proposal is that no other intermediary device is needed to be able to share information, as may be the case of the protocol RFID, in the case of the NFC protocol, no intermediary server is needed, the information in our case is shared directly between the devices that have the NFC protocol.

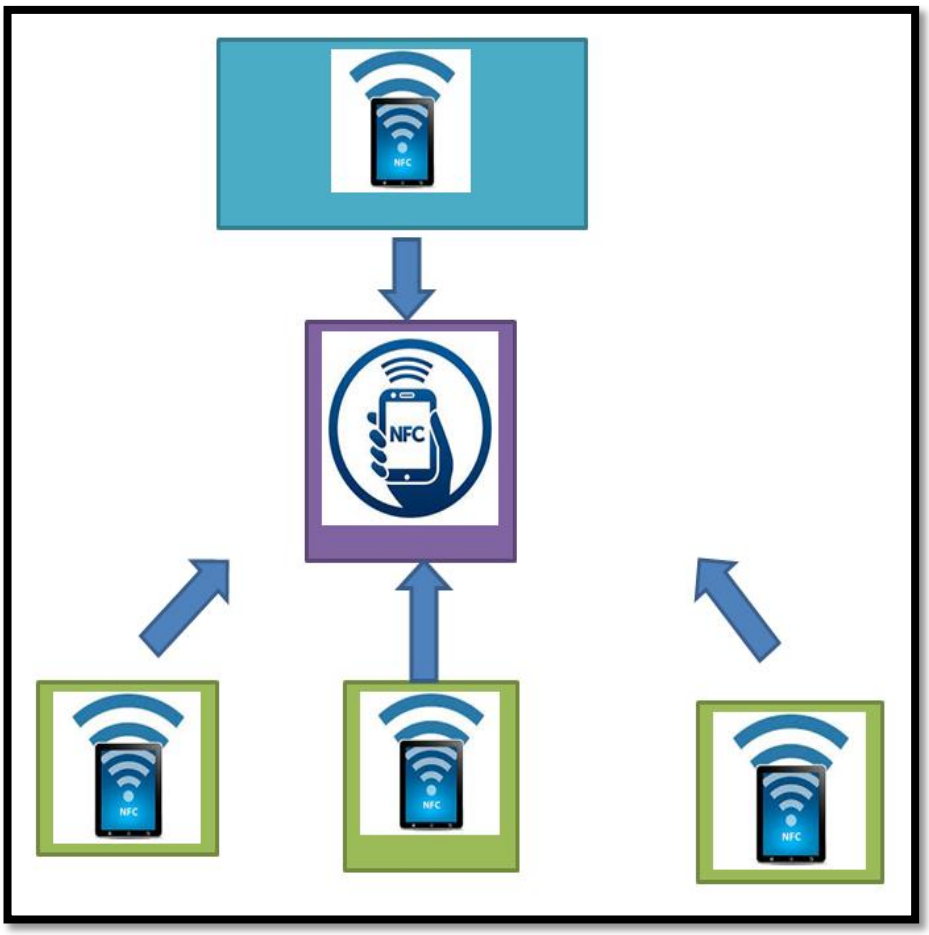



**Figure 2:** Proposal architecture

*2.3. Demo Application*

As a mechanism to test the model proposed in the present investigation, we show below the description of the implemented application, where each of the processes and the way in which the application stores and can be shared as well as the visualization of the information are described. , the application begins with the registration of the users, making a validation with the personal data, then the vaccination data is recorded as the vaccines are being carried out, and having this information available, below we present the application screens for your Explanation:




**Figure 3:** Main screen of the application

In figure 3, the welcome screen to the application is presented where it can be seen that the installation of the application was carried out correctly, as well as each of the processes to be carried out, such as the vaccination data, the data of the dates, health information to supplement the information as well as some health care information.

To start the application, it is necessary to register, using personal data, which can be the identity record of each person as well as a password, according to figure 4. The data is completed with personal data as well as Data of direct family members is also considered for the registry of minors, where the data of parents or direct representatives are registered.

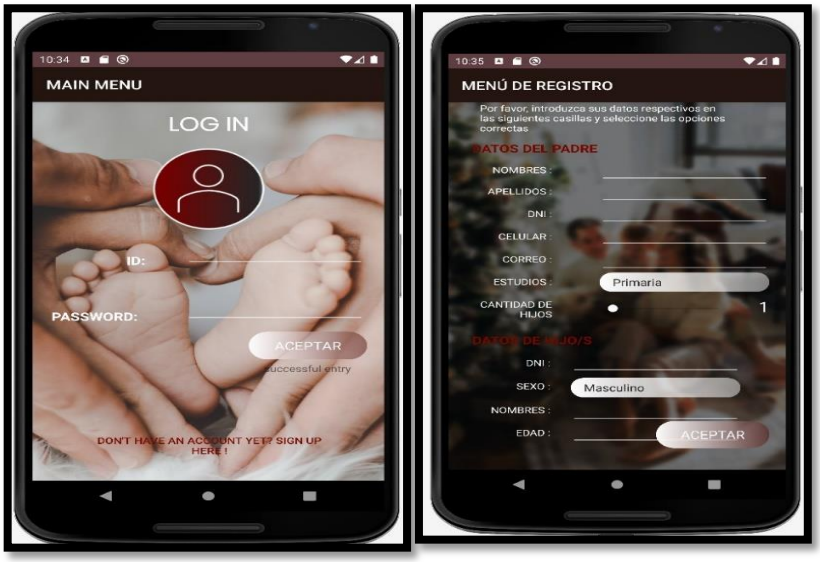



**Figure 4:** Starting screen

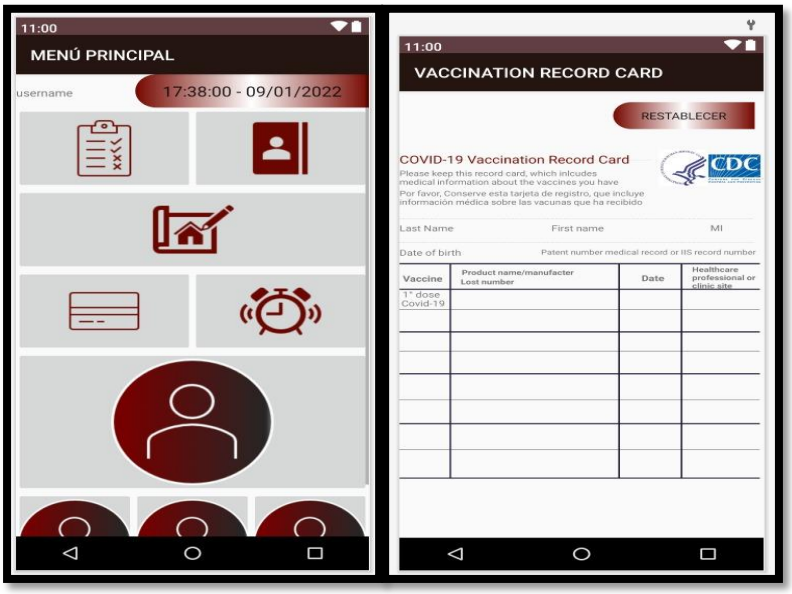



**Figure 5:** Application menu

In figure 6, the menu is presented with the options that can be selected, such as the vaccination registry, the personal data registry and the data report.

In figure 6, the form of the data of the vaccines carried out is presented, such as the type of dose supplied, the product and the manufacturer, such as the batch number, the date of the vaccine and finally the name of the health center As the professional who supplies the vaccine, in this form more than one dose can be registered, these entered data is available from the application so that it can be shared with other NFC devices, as well as it can be used to visualize the data, such as for verification compliance with vaccines.

## 3. Results

The results presented are organized in two stages, each one with a detailed description, the first is dedicated to mentioning the benefits and opportunities of being able to use the NFC protocol, the second to be able to replicate and scale the application for different uses and utilities that are required.

In the use of wireless protocols to share information, we find many such as infrared, RFID, among others, with the particularity of being able to have a main server to share information, in this work the use of the NFC protocol is used on the premise that no server is required to work with the protocol, since the information exchange is carried out from device to device directly.

In order to demonstrate the proposal, a mobile application was designed where the benefits of the NFC protocol can be demonstrated, in such a way that the application allows the registration with personal data for future validations, then the vaccine data is recorded, These data may vary according to the applications and uses, in our case the form was designed to record the number of doses, the vaccination date, the laboratory, the registry as well as the health personnel and the health center, all these data They are registered and available for exploitation according to needs.

## 4. Conclusions

We can conclude that as technology advances, new devices emerge as well as new communication protocols, which are dedicated to interconnecting devices and thus being able to share information, currently there are many applications that use different communication protocols to share information that are found. In mobile devices, in the present work we are presenting a method for the registration, exchange and visualization of the data obtained in the processes of the vaccine by Covid-19, which are being subjected to the majority of the world population, according to Time goes by, many of the institutions and governments are requesting information on vaccines, so it is necessary to have this information, be able to share and export them, we present a method to use the NFC protocol, with basic data that can be entered into the device and be able to be available.
The presented method is scalable and can be used for different uses and according to the situations that may arise, currently many of this data is required so it is necessary to always have it available, for its implementation it is recommended to be sure that your mobile device can have the NFC protocol, this requirement is necessary so that the requirement to share information can be met, otherwise the application would only serve for the registration and visualization of data generated in the vaccine processes to prevent the spread of Covid-19 .

## References

[1] Lotito and D. Mazzocchi, 2012, "OPEN-NPP: An Open Source Library to Enable P2P over NFC," 2012 4th International Workshop on Near Field Communication, pp. 57-62, doi: 10.1109/NFC.2012.16.

[2] E. Siira and V. Törmänen, 2010, "The Impact of NFC on Multimodal Social Media Application," 2nd International Workshop on Near Field Communication, pp. 51-56, doi: 10.1109/NFC.2010.16.

[3] V. Odelu, A. K. Das and A. Goswami,2016, "SEAP: Secure and efficient authentication protocol for NFC applications using pseudonyms," in *IEEE Transactions on Consumer Electronics*, vol. **62**, no. 1, pp. 30-38, February 2016, doi: 10.1109/TCE.2016.7448560.

[4] P. Urien, 2015, "New direction for open NFC trusted mobile applications: The MOBISIM project," *IEEE Conference on Communications and Network Security (CNS),* 2015, pp. 711-712, doi: 10.1109/CNS.2015.7346898.

[5] Z. Wang, Z. Xu, W. Xin and Z. Chen, 2012, "Implementation and Analysis of a Practical NFC Relay Attack Example," 2012 2nd International Conference on Instrumentation, Measurement, Computer, Communication and Control, pp. 143-146, doi: 10.1109/IMCCC.2012.40.

[6] N. A. Chattha, 2014, "NFC — Vulnerabilities and defense," 2014 Conference on Information Assurance and Cyber Security (CIACS), pp. 35-38, doi: 10.1109/CIACS.2014.6861328.

[7] M. Al-Tamimi and A. Al-Haj, 2017, "Online security protocol for NFC mobile payment applications," 2017 *8th International Conference on Information Technology (ICIT)*, 2017, pp. 827-832, doi: 10.1109/ICITECH.2017.8079954.

[8] P. Urien, 2013, "LLCPS: A new security framework based on TLS for NFC P2P applications in the Internet of Things," *IEEE 10th Consumer Communications and Networking Conference (CCNC)*, 2013, pp. 845-846, doi: 10.1109/CCNC.2013.6488560.

[9] Hasoo Eun, Hoonjung Lee, Junggab Son, Sangjin Kim and Heekuck Oh, 2012, "Conditional privacy preserving security protocol for NFC applications," *IEEE International Conference on Consumer Electronics (ICCE),* 2012, pp. 380-381, doi: 10.1109/ICCE.2012.6161911.

[10] C. Kowalevicz, J. Pirrone and M. Huerta, 2017, "Implementation model using a hippocratic protocol in mobile terminals with NFC technology," International Caribbean Conference on Devices, Circuits and Systems (ICCDCS), 2017, pp. 113-116, doi: 10.1109/ICCDCS.2017.7959706.